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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHING-YU CHANG and CHIN-HSIANG LIN

Appeal 2011-006709
Application 10/802,087
Technology Center 1700

Before BRADLEY R. GARRIS, ROMULO H. DELMENDO, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

Chin-Yu Chang and Chin-Hsiang Lin, the Appellants,¹ seek our review under 35 U.S.C. § 134(a) of a final rejection of claims 2-27.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

The invention relates to a method for cleaning a lens in an immersion lithography system (ILS), which is used in the manufacture of semiconductor devices. Specification (“Spec.”) ¶ [0001].

Claims 6 and 15 are representative of the appealed subject matter and are reproduced below:

- 6. A method for cleaning lens used in an immersion lithography system (ILS), the method comprising:
 - positioning a wafer in the ILS;
 - performing a light exposing operation on the wafer using an objective lens immersed in a first fluid containing surfactant; and
 - cleaning the objective lens after the light exposing operation using a second fluid having a higher surfactant concentration than the first fluid.
- 15. An immersion lithography system comprising:
 - means for positioning a wafer;
 - means for providing the first fluid containing no surfactant;

¹ The Appellants state that the real party in interest is Taiwan Semiconductor Manufacturing Co., Ltd. Appeal Brief filed September 13, 2010 (“App. Br.”) at 3.

² App. Br. 5; Final Office Action mailed April 7, 2010; Examiner’s Answer mailed November 24, 2010 (“Ans.”) at 4-18.

means for performing a light exposing operation on the wafer using an objective lens immersed in the first fluid; and

means for providing a surfactant to the first fluid to form a second fluid to reduce an adherence of floating defects to the wafer or the objective lens.

App. Br. 28-29 (Claims App'x).

The Examiner rejected the claims under 35 U.S.C. § 103(a) as follows:

- I. Claims 2-6 and 8 as unpatentable over Hazelton,³ Zhang,⁴ and Amblard;⁵
- II. Claim 7 as unpatentable over Hazelton, Zhang, Amblard, and Kraustchik;⁶
- III. Claims 9-13 as unpatentable over Hazelton, Lyons,⁷ and Amblard;
- IV. Claim 14 as unpatentable over Hazelton, Lyons, Amblard, and Zhang;
- V. Claims 15-19 as unpatentable over Deng⁸ and Hazelton;
- VI. Claims 20, 21, and 23 as unpatentable over Hazelton and Amblard;

³ U.S. Patent Application Publication 2006/0023185 A1 published February 2, 2006.

⁴ U.S. Patent Application Publication 2005/0161644 A1 published July 28, 2005.

⁵ U.S. Patent 7,056,646 B1 issued June 6, 2006.

⁶ U.S. Patent Application Publication 2004/0125351 A1 published July 1, 2004.

⁷ U.S. Patent 7,125,652 B2 issued October 24, 2006.

⁸ U.S. Patent Application Publication 2005/0164502 A1 published July 28, 2005.

VII. Claim 22 as unpatentable over Hazelton, Amblard, and Lyons;
and

VIII. Claims 24-27 as unpatentable over Hazelton, Amblard, and
Langford.⁹

Ans. 4-14.¹⁰

I.

In arguing against Rejection I, the Appellants focus only on independent claim 6. App. Br. 17-19. Therefore, we confine our discussion to claim 6. 37 C.F.R. § 41.37(c)(1)(vii).

We adopt and incorporate as our own the Examiner's factual findings and reasoning in support of a conclusion of obviousness as to claim 6. Ans. 4-5. With respect to the "cleaning" step using a "second fluid," as recited in claim 6, the Examiner concluded that a person of ordinary skill in the art would have been prompted to use Amblard's base developer as a cleaning liquid after a step of exposing a wafer to light in the presence of a different immersion fluid in Hazelton's method, as modified by Zhang. *Id.* at 5.

The Appellants urge that the Examiner's rejection should be reversed because Amblard teaches away from using a base developer as a cleaning fluid after a different immersion lithography fluid is removed. App. Br.18-19.

Thus, the dispositive issue is:

⁹ U.S. Patent 5,443,801 issued August 22, 1995.

¹⁰ The Examiner withdrew a final rejection under 35 U.S.C. § 102(b) of claims 15-19 as anticipated by WO 99/49504 A1. Ans. 3; Final Office Action at 2-4.

Did the Appellants demonstrate that Amblard teaches away from using its base developer as a cleaning fluid following a step of exposing light in the presence of a different immersion fluid?

DISCUSSION

We cannot agree with the Appellants that Amblard teaches away.

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1381 (Fed. Cir. 2007) (quoting *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)). “Additionally, a reference may teach away from a use when that use would render the result inoperable.” *Id.* (internal citation omitted). In assessing whether a reference teaches away, the decision-maker cannot “ignore the modifications that one skilled in the art would make to a device [or method] borrowed from the prior art.” *Id.*

In this case, Amblard touts the cleaning ability of the base developer, which may include surfactants. Col. 3, ll. 2-6; col. 4, ll. 25-31. Thus, a person of ordinary skill in the art would have reasonably expected that Amblard’s base developer would work as a cleaning liquid in Hazelton’s method. While the Appellants correctly point out that Amblard teaches “[a] developer is not contacted with the immersion lithography arrangement after the immersion lithography fluid is removed,” col. 7, ll. 58-60 and col. 8, ll. 47-50, the reference states so because the base developer is not only a cleaner, but also an immersion lithography fluid. Col. 3, ll. 2-6. Thus, Amblard actually teaches that “*it is not necessary* to contact a developer

with the irradiated resist after the immersion lithography fluid is removed.” Col. 2, ll. 8-10 (emphasis added); *see also* col. 2, ll. 48-58. A teaching that characterizes something as “not necessary” hardly constitutes a teaching away sufficient to successfully rebut the Examiner’s rejection. *Gurley*, 27 F.3d at 553 (“the nature of the teaching is highly relevant, and must be weighed in substance”).

When “weighed in substance,” we agree with the Examiner that a person of ordinary skill in the art would have expected Amblard’s base developer to be suitable as a cleaning fluid following the light exposing step in the presence of a different immersion lithography fluid. For these reasons, we uphold Rejection I.

II–IV, VI, & VII.

The Appellants rely on the same argument offered against Rejection I. App. Br. 19-21, 24-26. For the reasons given above, we find the argument unpersuasive. Therefore, we uphold Rejections II-IV, VI, and VII.

V.

The Appellants have argued claims 15-19 together. App. Br. 21-24. Therefore, we limit our discussion to claim 15. 37 C.F.R. § 41.37(c)(1)(vii).

Regarding the means-plus function limitation “means for providing a surfactant to the first fluid to form a second fluid to reduce an adherence of floating defects to the wafer or the objective lens” (claim 15), the Examiner found that the current Specification discloses a “secondary supply reservoir (Fig.4, not shown), as discussed in paragraph 26.” Ans. 9. The Examiner

then found that Hazelton describes such a structure, “which is fully capable of” performing the recited function. *Id.* at 10.

The Appellants contend that “the Examiner must show that Hazelton . . . specifically teaches performing exactly this recited function.” App. Br. 22. According to the Appellants, the Examiner failed to do this because Hazelton does not teach that the cleaning fluid is mixed with the immersion fluid. *Id.* at 23. Furthermore, the Appellants argue that Hazelton’s cleaning liquid is different from the surfactant-containing fluid recited in claim 15. *Id.* at 24.

Thus, the dispositive issue is:

Does Hazelton disclose, either explicitly or inherently, a “means for providing a surfactant to the first fluid to form a second fluid to reduce an adherence of floating defects to the wafer or the objective lens,” as recited in claim 15?

DISCUSSION

The Appellants failed to demonstrate error requiring reversal. Hazelton discloses a structure that is physically indistinguishable from that disclosed in the current Specification as corresponding to the claimed means. Hazelton’s Figure 10; Spec. ¶ [0026]. Although Hazelton does not operate the structure in the manner as recited in the disputed means-plus-function limitation, we agree with the Examiner that the prior art need not explicitly disclose the same function. Where the prior art structure reasonably appears to be capable of performing the recited function, the burden then shifts to the Appellants to come forward with evidence or reasoning to the contrary. *Cf. In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

Because the Appellants failed to demonstrate that Hazelton's structure is incapable of performing the recited function, we uphold Rejection V.

ORDER

Rejections I – VII are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

kmm